

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference VUB-003-PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416) | |
| International application No. PCT/EP 03/05805 | International filing date (day/month/year) 03.06.2003 | Priority date (day/month/year) 03.06.2002 |
| International Patent Classification (IPC) or both national classification and IPC C12P19/04 | | |
| Applicant VRIJE UNIVERSITEIT BRUSSEL et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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|--|---|
| Date of submission of the demand 23.12.2003 | Date of completion of this report 16.11.2004 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016 | Authorized Officer Lejeune, R Telephone No. +31 70 340-2347  |

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/05805**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*):

Description, Pages

1-33 as originally filed

Claims, Numbers

1-31 as originally filed

Drawings, Sheets

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:-

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/05805**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
- (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to the report.)*

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☐ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
- ☒ the parts relating to claims Nos. 1-5, 14-24 (completely), 12,13,25-31 (partially) .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----------|
| Novelty (N) | Yes: Claims | 12,23-31 |
| | No: Claims | 1-5,13-22 |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-5,12-31 |
| Industrial applicability (IA) | Yes: Claims | 1-5,12-31 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

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IV. Non Unity

The international search report has been drawn up for all the claims of the international application. In accordance with the ISA, the IPEA considers the application not to fulfil the criteria for unity of invention as set forth in the regulations. The applicant is invited to either restrict the claims so as to comply with the requirements or to pay additional fees.

The reasons for the lack of unity of invention are:

The application deals with the production of exopolysaccharides and the microorganisms used therein.

Streptococcus thermophilus strains which are able to produce high molecular weight exopolysaccharides, even having the structure as shown in claim 9, and methods for producing these exopolysaccharides, are known in the prior art:

Faber et al. (Carbohydrate Research, 310:269-276, 1998) disclose an EPS having 2.6×10^6 Da having the same structure as shown in claim 9, produced by *Streptococcus thermophilus* Sts.

Furthermore, the use of *Streptococcus thermophilus* strains as starter cultures is common knowledge.

In the light of the prior art, a first problem to be solved by the present application is to provide an alternative bacterial strain for producing EPS.

The solution is a the *Streptococcus thermophilus* ST 111 strain.

A second problem to be solved is the provision of a further method for preparing EPS.

The solution is a method comprising culturing a lactic acid bacterial strain in a medium comprising milk and lactalbumin hydrolysate.

A third problem to be solved is the provision of a further lactic acid bacterial starter culture.

The solution is a starter culture comprising an exopolysaccharide producing lactic acid bacterial strain for the production of heteropolysaccharides of at least 2×10^6 Da.

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/05805

Due to the fact that processes for the preparation of EPS are known, due to the fact that *Streptococcus thermophilus* strains producing EPS are known, due to the fact that starter cultures comprising lactic acid bacteria are known, and due to the essential difference between the various problems and their solutions, and due to the fact that no other technical features can be distinguished which, in the light of the prior art could be regarded as special technical features, the IPEA is of the opinion that there is no single inventive concept underlying the plurality of claimed inventions of the present application in the sense of rule 13.1 PCT.

The inventions are

Invention 1: Claims 1-5, 14-24 (all completely), 12, 13, 25-31 (all partially):

Streptococcus thermophilus ST 111, uses thereof, exopolysaccharide produced by ST 111, method for producing the exopolysaccharide by ST 111 and use of this exopolysaccharide.

Invention 2: Claims 6-11 (all completely), 12, 13, 25-29 (all partially):

A method for preparing an exopolysaccharide in a medium comprising milk and lactalbumin hydrolysate, the exopolysaccharide and its use, as far as not covered by invention 1

Invention 3: Claims 30, 31 (all partially)

A starter culture for the production of high-molecular-mass heteropolysaccharides of at least 2,000,000 Dalton, as far as not covered by invention 1.

The Applicant did not restrict the claims and did not choose an invention on which the preliminary examination is to be conducted. Consequently, the first invention is the subject of the present preliminary examination.

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V. Reasoned statement under Rule 66.2 (a)(ii) PCT

Reference is made to the following documents:

D1: FABER E J ET AL: CARBOHYDRATE RESEARCH, vol. 310, no. 4,
August 1998 (1998-08), pages 269-276

The application deals with *Streptococcus thermophilus* ST 111, the exopolysaccharide produced by said strain and the uses of the strain and the EPS.

NOVELTY (Art. 33(2) PCT)

D1 describes (see abstract, Table 1) the production of an exopolysaccharide having the same structure as the structure depicted in figure 3A of the present application. The EPS is produced by a *Streptococcus thermophilus* strain and has an apparent molecular mass of $2.6 \cdot 10^6$ or $3.7 \cdot 10^6$ Dalton (resp. for the Rs and the Sts strain).

Consequently, the subject matter of the claim 13, pertaining to the exopolysaccharide *per se*, is not new.

The claimed strain *Streptococcus thermophilus* ST 111 is not new because it cannot be distinguished from the known dairy strains of *Streptococcus thermophilus* (see D1) which produce the same exopolysaccharide. Therefore, the subject matter of claims 1-5, 14-22 is not new.

The subject matter of claim 12 is new because the use of a milk medium supplemented with lactalbumin hydrolysate for the production of EPS by *Streptococcus thermophilus* is not disclosed in the prior art.

INVENTIVE STEP (Art. 33(3) PCT)

The dependent claims 12, 23-31 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step as the relevant subject matter is either disclosed in the cited prior art or falls within

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/05805

the knowledge and ability of the skilled person.

The following conditional inventive step assessment applies should the novelty of the subject matter of claim 1 be (re)established:

The subject matter of claims 1-5, 14-31 does not involve an inventive step, because in the light of D1 (which can be considered as the closest prior art) it corresponds merely to the provision of a further high molecular weight producing *Streptococcus thermophilus*. The solution (the ST 111 strain) does not have any surprising or beneficial effects and cannot therefore involve an inventive step.

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